Worldwide efforts to eliminate the perceived problem of toxic materials from electronic products has caught up with GaAs chip producers. However ironic it may seem, the attention is not directed at the Group V elements found in the chips but rather the lead in the solder interconnect.

'Lead-free' has become the watchword of the electronics manufacturing industry. It gained particular emphasis when Intel recently stated that it too was working on such processes. This was hardly news since it has been a preoccupation of the industry for around a decade.

Roy Szweda, Associate Editor

Handsets go 'lead-free'

The III-Vs industry has also been busy dealing with the new regulations and the latest products likely have the first of the lead-free MMIC modules in them. Perhaps soon handsets and their like might display stickers proclaiming this. Such is the power of marketing that a cachet like this might get you ahead of the competition. In down-to-earth practical terms the upshot is that every single component in a handset must comply with the lead-free environmental directive. RF module makers too must now switch away from the lead-tin solders they have been using for years to exotic alloys containing bismuth and so on.

This compliance has been bad news for an industry where margins are already tight. For several reasons most to do with adding cost, the manufacturers were reluctant to take these steps voluntarily. All manufacturing processes are finely tuned, balanced mechanisms which dislike disturbances however tiny. Changing the 'glue' which holds it all together is a major request. It has taken considerable time, effort and money to carry out. Not only does it require testing and proofing of these new replacement solders but also checking all of the other parts of the system for compatibility. This is particularly critical at the stage called 'reflow' where all the components are soldered to the board in one continuous process. This needs different temperature profiles which may adversely affect the chips or the laminate circuit board.

Behind the scenes these companies have been working in concert with the OEMs to optimise their processes according to the new regulations. Without the accreditation, contracts would be terminated and so the chip suppliers really had little choice in the matter. The authorities have, however, been lenient with the timescale of the introduction of the new rules. This is why it is only now that the press releases are stressing the 'lead-free' aspect of new products.

While others will be making their own announcements in due course, those that choose not to go down this route will inevitably suffer. This is because they will not be able to continue with existing contracts nor secure new ones. Lead-free has thus become a competitive weapon. The first with the goods will as usual reap most benefit. For the smaller fry it could mean exiting the business. They may decide the costs involved are too much for them. In a market downturn this was bad news for everyone and those that have achieved compliance are to be applauded for their efforts. Our sympathies go to everyone else.

While the lead-free initiative is a step in the right direction one can but wonder whether the day will come when attention turns to other toxic materials. While there is proportionately more lead in the average cellphone than there is GaAs the relative toxicity is marked. It will not only affect this compound of course. While GaN and SiC should escape scrutiny, mercury and antimony will not. SiGe should be OK as should virtually all silicon chips. Whether this will become a factor in the equation remains undecided. The industry will simply have to keep its head down and hope.

Finally, the more cynical point out that a problem is all the handsets already thrown away. All well and good dealing with new products but no-one has a solution to the problem of landfill. The business is notorious for the casual way handsets are discarded for new feature-enhanced ones. While this underpins its ongoing success, it creates a problem. Somehow these and all the other electronic junk must be collected and recycled. That problem is going to make fixing lead-free chips seem like child's play.